INTERIM REPORT

RCRA FACILITY INVESTIGATION

RMI SODIUM PLANT

ASHTABULA, OHIO

Prepared for:

RMI Company Niles, Ohio

US EPA RECORDS CENTER REGION 5



Prepared by:

AWARE Incorporated 227 French Landing Drive Nashville, Tennessee 37228

July 1988

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U. S. EPA, REGION V



consultants in environmental management

July 5, 1988

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Mr. Joe T. Holman Director, Environmental Affairs RMI Company 1000 Warren Avenue Niles, OH 44446

Dear Joe:

We have completed Tasks 1 and 2 of the RCRA Facility Investigation (RFI) for the RMI Sodium Plant located in Ashtabula, Ohio. This document constitutes our Interim Report for the project, as agreed during our February 19 meeting with Francine Norling. Based upon the outputs of these first two work tasks, and in consideration of Ms. Norling's comments in February, we are proposing several amendments to the June 1987 Work Plan for the project.

TASK 1: COLLECTION AND INTERPRETATION OF EXISTING INFORMATION

We have compiled and reviewed a variety of background information documents for the Sodium Plant and environs. These included historical aerial photos available at the plant, the CERCLA 104 response, the results of recent hydrogeologic findings for the nearby Extension Plant, among other items.

During the remainder of the project, we will continue to consider this historical backdrop as we evaluate new findings.

Exhibit A is a site topographic map which depicts to scale the approximate locations of the previous and existing solid waste management units (SWMUs). The tabular summary (Exhibit B) provides a coded listing of pertinent information such as physical dimensions, period of use, possible hazardous constituents, etc.

Mr. Joe T. Holman Page 2 July 5, 1988

This complements the information previously provided in Sections 2 and 3 of the Work Plan. There were no additional potential receptors identified other than those described in Section 3.4 of the Work Plan.

Exhibit C provides the data Ms. Norling requested regarding the EP Toxicity tests for sludges in the Wastewater Treatment Ponds, which establish that these sludges are not hazardous wastes.

The abandoned pond located to the east of the closed landfill was confirmed to not be a SWMU, based upon RMI's CERCLA 104 response submitted in 1986 (see Section 3.3.1 of the Work Plan).

The Sulfuric Acid Neutralization System, which is a part of the NPDES treatment system, is an active SWMU. However, because the neutralization is accomplished in suitable tanks, and there is no history of release, field investigations for this system are not warranted. We trust that Ms. Norling will concur with our assessment.

TASK 2: GEOPHYSICAL SURVEYS

The geophysical surveys were completed this spring, and results are summarized in Exhibit D. Four previously identified areas of waste disposal activity are associated with zones of high apparent conductivity. Also, in these four areas, there is a distinct increase in apparent conductivity with depth. We have considered the results of the survey in preparation of several of the proposed amendments to the Work Plan.

PROPOSED AMENDMENTS TO THE WORK PLAN

Based upon the results of Tasks 1 and 2, and review of USEPA's comments, AWARE proposes the following amendments to the June 1987 Work Plan.

INTERMEDIATE HYDROGEOLOGIC INVESTIGATION

The numerous surface water features at the site indicate the presence of a fairly complex shallow groundwater flow system. The complexity of this system is also indicated from the surface geophysical survey results. Although the surface geophysical survey of the site has yielded useful information on the lateral extent of buried wastes and/or contaminant migration from these wastes, conflicting indications of groundwater flow direction are suggested. The situation is further complicated by the presence of several potential sources of groundwater contamination at the site as well as a potential for contaminant migration into the area from off site sources.

Our goal is to design and implement a groundwater monitoring program which provides maximum efficiency at a minimum cost. In order to accomplish this goal we propose to add an intermediate phase to the Work Plan which will

Mr. Joe T. Holman Page 3 July 5, 1988

provide a better definition of groundwater flow. Because information on groundwater flow direction is essential to the effective placement of monitoring wells, this intermediate phase will precede the final selection of locations for the proposed soil borings and monitoring wells.

The proposed intermediate phase will be conducted as follows:

Piezometer Installation

Twenty piezometers will be installed at key locations at the site as shown in Figure 1. The exact locations of these piezometers will be determined in the field.

Each piezometer will be installed by advancing a 6 in. diameter hollow stem auger to a depth of approximately 5 ft below the water table surface (average 10 ft total depth per well point). Upon reaching the target depth, a 1.5 in. diameter, 5 ft length of PVC screen will be attached to a 1.5 in. diameter PVC riser pipe and inserted into the hole. The annular space around the screen and riser will be filled with clean, coarse sand from the base of the screen to 6 in. below ground surface. To divert drainage and stabilize the pipe, the remainder of the annular space will be filled with cement grout, mounding the grout around the riser pipe (see Figure 2). The construction of the piezometer located in the center of the closed landfill will include the addition of a 2 ft thick bentonite seal placed below the cement grout. This modification should serve to maintain the integrity of the clay cap present over the closure.

Organic contaminants are not expected to be present at the site. However, as a precaution, continuous air quality monitoring will be accomplished with the HNU unit during drilling and piezometer installation.

Gauge Station Installation

Stream gauges will be installed at several locations (see Figure 1) along the DS Tributary of Fields Brook, along drainage ditches, and at each of the nine surface water impoundments located at the site. These gauges will provide the reference points from which to determine the elevation of these various bodies of surface water in the site study area.

Each gauge will consist of a mark placed on a permanent structure (or tree) adjacent to the surface water body. In the event that the appropriate structure does not exist in the desired location, a length of PVC pipe driven into the ground will serve as the reference point. The top of each of these points would be referenced to the same elevation datum as are the site piezometers.

The elevation of all piezometers and staff gauges will be measured by a licensed surveyor upon their completion. The locations of these gauges and piezometers will be oriented to the site topographic map (see Figure 1).

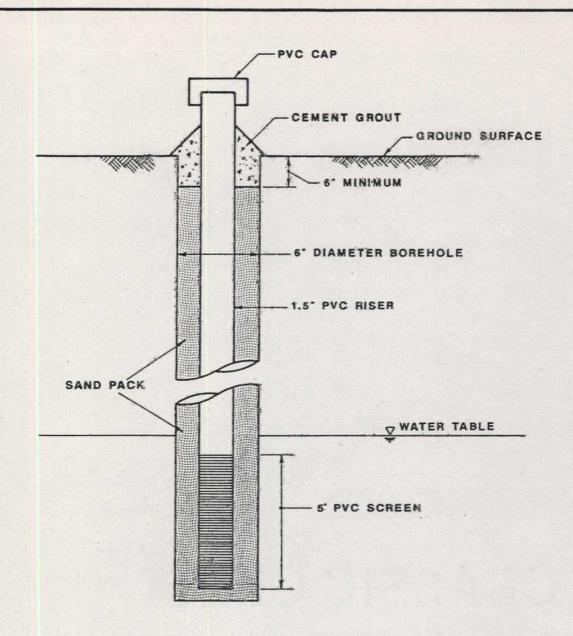


FIGURE 2

TYPICAL PIEZOMETER CONSTRUCTION

RUARE INCORPORRTED NASHVILLE, TENNESSEE WEST MILFORD, NEW JERSEY Mr. Joe T. Holman Page 6 July 5, 1988

Data Collection, Reduction, and Interpretation

After a sufficient amount of time has passed to allow for piezometer water levels to recover to static conditions, water level measurements will be collected. On at least two separate occasions, the depth to water in each piezometer will be measured with a hand held water level indicator and surface water elevations will be measured. This data will be used to construct a comprehensive water table elevation contour map indicating groundwater flow direction. This map will be used in conjunction with the isoconductivity maps from the surface geophysical survey to select the optimum locations for placement of the monitoring wells and soil borings described in the Work Plan.

2. SHALLOW MONITORING WELL INSTALLATION REVISION

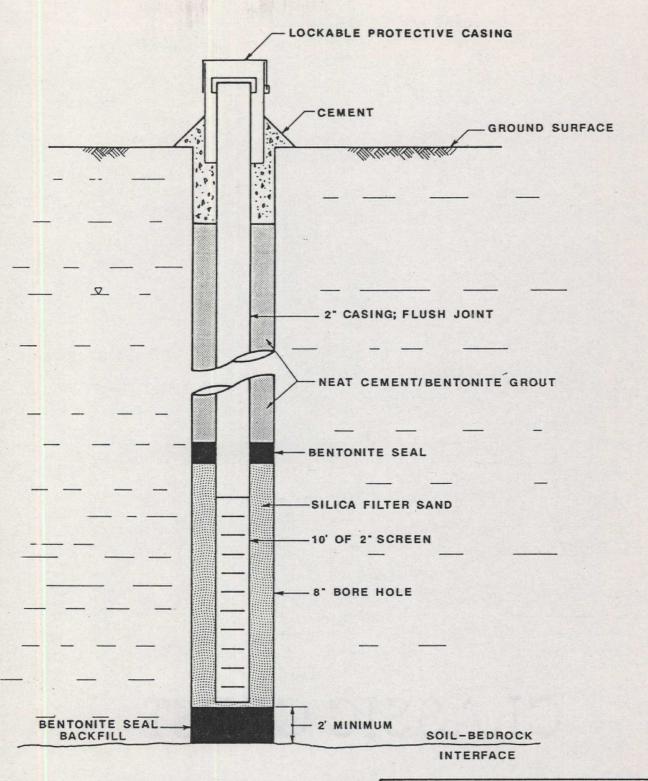
Task 4 of the Work Plan describes the proposed installation of nine shallow monitoring wells into nine of the 16 soil borings described in Task 3. These soil borings are to be advanced to the soil bedrock interface prior to well installation. The well installation includes a sand pack interval to be placed from the soil-bedrock interface to a point above the well screen. With this well design, a potential exists to facilitate the vertical migration of possible contaminants from the overlying soils to the underlying shale bedrock.

We propose to eliminate this potential problem by modifying the shallow monitoring well construction design to include backfilling each of the nine soil borings with a bentonite seal (no less than 2 ft in thickness) before commencing with the well installation described in Task 4 of the Work Plan (see Figure 3).

3. CLARIFICATION: FIELD-ANALYSIS OF SOIL CORES WITH HNU PHOTOIONIZATION UNIT

As described in the Work Plan, continuous soil core will be recovered utilizing a 5 ft split tube coring device. The core will be logged by a trained hydrogeologist, and field-analyzed by means of an HNU photoionizer to determine the presence of volatile organic vapors. Selected core intervals will be recovered and submitted to laboratories for analytical determinations in accordance with EPA analytical techniques.

A clarification of the field analysis methods has been requested and is provided herein. Upon the removal of the 5 ft core tube and opening it lengthwise, a portable HNU photoionization unit will immediately be brought alongside the tube. The probe tip of the HNU unit, which intakes ambient or specific air samples as required, is carefully and slowly traversed along the length of the soil core, at a height barely above the soil surface (within 0.1 in.). [On days when the wind is less-than-calm, the core tube will be shielded by the best means available, to ensure accuracy of the HNU intake.]



SHALE BEDROCK

FIGURE 3

SCHEMATIC OF TYPICAL
SHALLOW WELL CONSTRUCTION

AWAREINCORPORATED

NASHVILLE, TENNESSEE WEST MILFORD, NEW JERSEY

SCALE: NONE

Mr. Joe T. Holman Page 8 July 5, 1988

Prior to the initiation of field-analysis of the soil cores, the HNU unit will be calibrated with the supplied calibration gas. This calibration method is further described in another section of this response. Background ambient air and soil measurements will be recorded for future comparison. During drilling, HNU readings will be collected from within the borehole, at ground surface.

Once the field analysis of the soil core is completed, representative samples of the core will be collected and submitted to laboratories for analysis. In those soil cores where responses are seen in field meters, samples will be split into two fractions. One soil fraction will be collected in a glass jar capped with aluminum foil, and allowed to equilibrate to ambient temperature. The HNU probe will then be used to pierce the foil cap, and a "headspace" reading will be measured. The other soil fraction will be collected in appropriate containers and submitted to the laboratory for organic analysis.

4. CALIBRATION OF THE HNU PI 101 ANALYZER

A complete maintenance schedule is performed on the HNU analyzer by AWARE's Instrumentation Specialist (IS). This schedule includes in-house calibration and operation prior to field use, and cleaning, calibration, and operational checks upon return. However, field calibration is mandatory on the species and concentration range required by the individual operator. The following represent steps to properly calibrate the HNU analyzer, utilizing benzene gas for calibration with the 10.2 eV probe. The process of calibration will be outside any suspect or contaminated area. Calibration of the HNU analyzer will be conducted at the beginning of each day, when the range is changed, or if problems with the instrument are encountered.

- Step 1 Set the range setting at X10 (this range will provide accurate values on the X1 range also).
- Step 2 Attach the 10.2 probe to the read-out assembly, insuring red interlocking switch is depressed.
- Step 3 Attach the benzene gas cylinder regulator to the HNU 10.2 probe.
- Step 4 Adjust the flow from the regulator so that only a little excess flow is registered at the flowmeter. (Insures HNU sees calibration gas at atmospheric pressure and ambient temperature). NOTE: if calibration gas cylinder reads 300 psi or less, the cylinder should not be used as it may cause concentration variations.
- Step 5 Turn function switch to BATT and ensure the needle is in green area. (If not, battery requires recharging.)
- Step 6 Turn function switch to STANDBY. Set zero point with zero set control.

Mr. Joe T. Holman Page 9 July 5, 1988

Step 7 • For 0 to 20 or 0 to 200 range, turn function switch to that setting and note meter reading. Adjust SPAN control to read the ppm concentration of the calibration gas. (Noted on cylinder of calibration gas.)

Recheck zero setting (step 6). If readjustment is required, repeat step 7. (This gives a two-point calibration, zero and the calibration gas standard point).

Step 8 • Calibration checking:

- Immediately after calibration, make a reading using the isobutylene standard. The concentration as stipulated on the isobutylene cylinder should be reflected.
- -- Periodic checks using the isobutylene standard during the period of HNU operation can provide a rapid calibration check in the field. The field results should compare with that concentration found during initial calibration check.

Any problems encountered with calibration should warrant contact with the Corporate Health and Safety Coordinator or Instrumentation Specialist. Under no circumstances will the HNU be utilized in the field until all problems have been resolved, and proper calibration accomplished.

5. MONITORING WELL CONSTRUCTION MODIFICATIONS

AWARE has proposed, in the Work Plan submitted for the RMI Sodium Plant, that groundwater monitoring wells are to be constructed across the site for the sampling of groundwater for water quality, and for the measurement of piezometric levels in the determination of water-table gradients. Nine shallow wells are to be completed in the glacial till underlying the site and four deeper wells will be completed in the shale bedrock.

It was initially proposed to construct all groundwater monitoring wells with Teflon and to use dedicated Teflon bailers for the purging and sampling of each well. However, after a reevaluation of the objectives of the project and in light of recent experience and information gathered on monitoring well construction, AWARE proposes now to construct all monitoring wells with polyvinyl chloride (PVC) casings and screens. All screens and casings will be threaded and flush-mounted with no glue or solvents used. It is AWARE's intention to construct the most technically appropriate, yet cost-effective, monitoring system at RMI.

The groundwater quality monitoring objectives to be accomplished at the RMI Sodium Plant are the: 1) "finger-printing" of the groundwater quality across the site through major ion analysis, 2) analysis for EPA Primary Drinking Water metals, and 3) a priority pollutant scan on the four wells to be located at the corners of the closed landfill. Two sets of water quality samples will be collected from the wells, separated by a two to three month time interval.

Mr. Joe T. Holman Page 10 July 5, 1988

The priority pollutant scan will be collected during the first sample event only.

Based on the experience AWARE has had with installation of Teflon wells, and after review of current literature, it is our opinion that PVC wells will serve as an acceptable alternative to Teflon in this specific monitoring scenario. The following points should be considered:

- Nine of the thirteen wells to be installed are to be sampled for inorganic constituents, none of which are compromised by PVC's chemical composition. Those wells which will be sampled for the priority pollutant scan (during the first sample event) will not be in contact with the PVC for a time long enough to affect chemical composition. Each monitoring well will be evacuated of three to five standing well volumes before sampling, which will effectively remove stagnant water from the well and introduce fresh aquifer water. Before installation as a monitoring well, all PVC casing and screens will be steam cleaned to remove any oils, grease, or other foreign matter.
- AWARE has had previous recent experience with Teflon well installations, and has found that Teflon is very difficult to Also, Teflon well casings have deformed (bowed) during warm weather to the point that one questions the accuracy of water level measurements. Drilling companies subcontracted to AWARE in the past have expressed great reservations in dealing with Teflon, and have had similar difficulties. A good summation of some of the difficulties encountered when dealing with Teflon can be found in Ground Water Monitoring Review, Vol. VIII, No. 1, Winter, 1988 in an editorial written by David M. Nielsen. In the article, Mr. Nielsen says, "The plain fact is, fluoropolymers aren't well suited for use as well casing materials; their physical properties simply do not lend themselves well to applications in vertical boreholes completed as wells. Why not? Consider the following: (1) the very low tensile strength and high weight per unit length of fluoropolymer materials (especially compared to other plastics) results in a significant limitation on installation depth and a high potential for failure at casing joints; (2) the material's low compressive strength, high weight per unit length and ductile behavior results in the partial closing of fluoropolymer well screen openings and a consequent reduction of well efficiency; (3) the extreme flexibility and lack of rigidity of fluoropolymer well casing causes casing strings to become bowed and non-plumb in the borehole during installation; (4) because of the lack of compressive strength and the cold-flowable nature of fluoropolymers, screens are only available in slotted casing, which can clog easily and make well development difficult; (5) the non-stick nature of fluoropolymers that makes them so desirable in other applications results in the lack of formation of a competent annular seal with neat cement grout; and (6) recent research at the University of Waterloo

Mr. Joe T. Holman Page 11 July 5, 1988

> suggests that even the highly touted chemical inertness of fluoropolymer materials is suspect—they may indeed sorb certain organic chemicals at rates and amounts faster and higher than other plastics".

> Earlier research on the subject, which supports use of non-glued PVC in organic-constituent monitoring, can be found in:

- Curran, C.M. and Tomson, M.B. 1983. Leaching of Trace Organics into Water From Five Common Plastics. Ground Water Monitoring Review, Vol. 3, No. 3.
- Miller, G.D. 1982. Uptake and Release of Lead, Chromium, and Trace Level Volatile Organics Exposed to Synthetic Well Casings.

 Proceedings of the Second National Symposium of Aquifer Restoration and Groundwater Monitoring. National Water Well Association. Worthington, Ohio, pp. 236-245.
- Clearly, Teflon is cost-prohibitive in maintaining costeffectiveness in installing a groundwater monitoring network. Costs of installing a Teflon system at the RMI Sodium Plant will be approximately three times the costs associated with a PVC system of the same design. As earlier stated, since this is the first, investigatory phase of the groundwater monitoring network, the costs and inherent installation problems of Teflon clearly support the use of PVC.

6. CLARIFICATION: NUMBER OF DEEP MONITORING WELLS

As stated on p. 4-10 of the Work Plan, AWARE plans to install four (4) deep monitoring wells, at locations RMI-lD, -2D, -4D, and -5D. The label for well RMI-5D was inadvertently left off of Figure 4-l in the Work Plan.

7. PERMEABILITY TESTING

In order to define the permeability of the glacial till underlying the plant site, it was initially proposed by AWARE to conduct recharge tests in the monitoring wells, as well as a recirculation barrel aquifer test (as developed by Hurr of the USGS).

Since the submittal of the proposed Work Plan for client and agency approvals, recirculation barrel aquifer tests have been designed and completed at the nearby RMI Extrusion Plant, and at another facility located on the same underlying glacial till. The results of these tests were less than favorable due to the extremely low recharge rates of the groundwater into the monitoring wells. Data produced during recent studies at the RMI Extrusion Plant have indicated an "average" permeability of 3.2×10^{-6} cm/sec at the site. This low permeability value, coupled with the soil composition of clay till

Mr. Joe T. Holman Page 12 July 5, 1988

underlying the area, no longer supports the use of the recirculation barrel test. It is therefore proposed to be deleted from the Work Plan.

In order to determine the in-place permeability of the saturated materials at the Sodium Plant, field tests will be performed on selected monitoring wells. Recovery tests are an appropriate method for determining the in situ permeability of the water-bearing strata. These tests involve lowering the water level in the well via pumping or bailing, and measuring the change in head with respect to time as the well is allowed to recover.

The recovery tests are to be conducted as follows:

- The static water level in the well to be tested is measured and recorded.
- The water level in the well is drawn down as much as possible by the use of a bailer or pump.
- At frequent time intervals, the water level in the well and the respective elapsed time from the beginning of the test are measured and recorded.
- This is continued until the water level has recovered approximately
 90 percent of the amount lowered from the static water level.

It is assumed that the rate of inflow into the well after pumping, at any time, is proportional to the permeability (k) and to the unrecovered head distance. A plot of the unrecovered head distance or head ratio $(h_{\rm t}/h_{\rm o})$ versus the time (t) indicates an exponential decline in the recovery rate with time.

The following equation is used to calculate the in situ permeability of the aquifer at the screened interval of the well:

$$k = \frac{r^2}{2L (t_2 - t_1)} \cdot \ln \left(\frac{L}{R}\right) \cdot \ln \left(\frac{h_1}{h_2}\right)$$

Where:

r = screen radius

R = gravel pack radius

L = screen length

t₁ = time interval corresponding to h₁

t₂ = time interval corresponding to h₂

 h_1 = head ratio at time t_1 h_2 = head ratio at time t_2

k = hydraulic conductivity in cm/sec

Since the validity of the data derived from in situ tests are dependent upon effective hydraulic communication between the well screen and the formation, the wells must be adequately developed prior to performance of the tests.

Mr. Joe T. Holman Page 13 July 5, 1988

8. BACKGROUND SURFICIAL SOIL SAMPLING

In addition to the surficial soils sampling described in Task 7 of the Work Plan, a minimum of four surficial soil samples will be collected at the site to serve as background samples. The background samples will be collected from locations at the site which are remote to the known or suspected waste disposal areas. These background samples will be subject to the same collection procedures and laboratory analysis parameters as described in Task 7 of the Work Plan.

9. CLARIFICATION: WASTEWATER TREATMENT POND LIQUID AND SEDIMENT SAMPLES

As described in Task 8 of the Work Plan, liquids and sediments in each of the five ponds will be sampled at two (2) locations. The pond samples will be composited on an equal volume basis, resulting in five liquid samples, and five sediment samples (one composite of each phase from each pond). Chemical analyses specified in the Work Plan will be performed on these composite samples.

10. INTERIM SUBMITTAL OF GROUNDWATER QUALITY DATA

As requested by USEPA, the results of the first set of groundwater quality samples will be shared with the Agency to allow for their review as well as review by RMI and AWARE.

11. ASSESSMENT OF NEED FOR INTERIM CORRECTIVE MEASURES

As requested by USEPA, data obtained during the course of the project will be assessed on a continuing basis to determine if there is a need for implementation of interim corrective measures at the site. Such measures would be warranted if an acute or imminent human health concern is discovered. This is considered to be unlikely for the RMI Sodium Plant site.

12. SUPPLEMENTAL CHEMICAL CHARACTERIZATION OF ENVIRONMENTAL MEDIA

Because the Sodium Plant is, and always has been, an inorganic chemical facility with a limited product mix, and generated waste characteristics are well-defined, a focused approach to chemical analysis of environmental media is possible and was employed in the Work Plan.

The exception to this is the possibility that organic chemicals have migrated onto or beneath the property from off-site sources located to the south. Therefore, priority pollutant scans were scheduled for the southernmost groundwater monitoring wells (see p. 4-11 of Work Plan) and for two surface water samples in the DS tributary (see p. 4-13 of Work Plan).

Mr. Joe T. Holman Page 14 July 5, 1988

In response to USEPA's request to consider confirmatory, broad scans of other environmental media at the site, AWARE proposes to supplement the environmental media chemical characterization work with priority pollutant scans at two additional locations, enumerated below:

• one (1) of the core intervals from the boring for RMI-9S, adjacent to the fill area north of the existing Wastewater Treatment Ponds;

· and

one (1) of the surficial soil samples planned for the fill area north of the Wastewater Treatment Ponds.

AWARE believes the results of Tasks 1 and 2 of the RCRA Facility Investigation have been useful in the definition of potential releases from the RMI Sodium Plan, and we trust we have been responsive to USEPA's comments received earlier this year.

If there are any items which require clarification, please do not hesitate to contact us.

Sincerely,

AWARE Incorporated

Jeffrey L. Pintenich, P.E.

Vice President

cc: B. Brawley

R. Guidry

W. Hansard

S. MacMillin

D. Showers

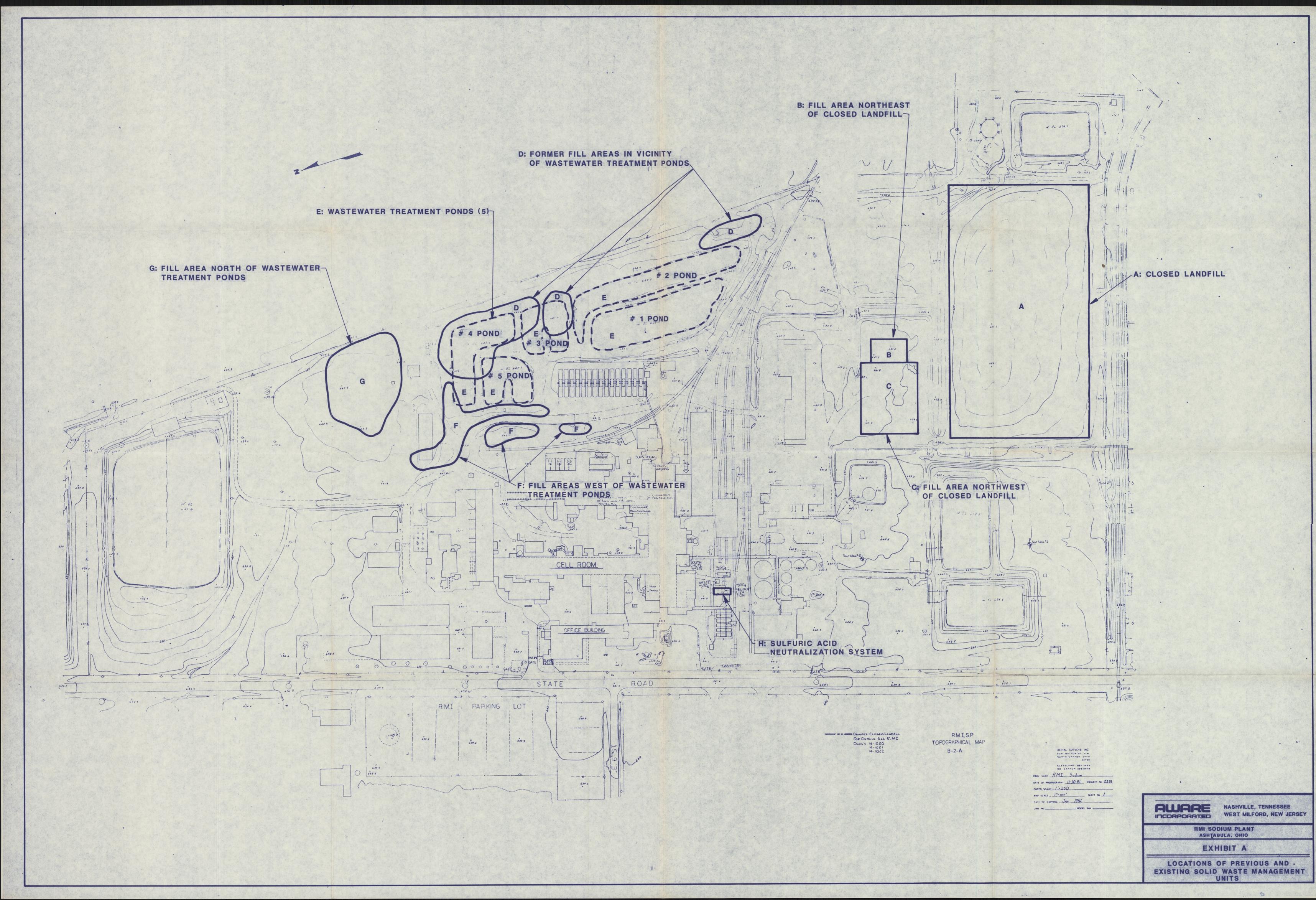


EXHIBIT B

PROFILE OF PREVIOUS AND EXISTING SOLID WASTE MANAGEMENT UNITS^a RMI SODIUM PLANT ASHTABULA, OHIO

Map Code	Name	Approx. Dimensions	Status	Period of Use	Potenital Hazardous Constituents	Other Information
A	Closed landfill	400 ft x 700 ft;	Closed	1950 to 1980	barium, cadmium, lead	Closed in 1981; 2 ft clay cap
В	Fill area north- east of closed landfill	50 ft x 100 ft	Imactive	1950 to 1981	barium, cadmium, lead	Wastes reportedly removed to landfill during closure in 1981
С	Fill area north- west of closed landfill	150 ft x 200 ft	Inactive	1960s to 1981	barium, cadmium, lead	Wastes reportedly removed to landfill during closure in 1981
D	Former filt areas in vicinity of wastewater treatment ponds	#1 @ 150 ft x 300 ft #2 @ 80 ft x 120 ft #3 @ 60 ft x 175 ft	Inactive	1950s to 1960s	barium, cadmium, lead	Fill area encompassed area now occupied by Pond Nos. 2, 3, 4, 5; filled low areas
E	Wastewater. Treatment Ponds					Perimeter french drain installed in 1980
	Pond No. 1	100 ft x 400 ft (1.7 millgal)	Active	1950 to present	chromium, lead, selenium	
	Pond No. 21	40 ft x 500 ft (1.4 mil/gal)	Active	1956 to present	chromium, lead, selenium silver	
	Pond No. 3	170 ft x 170 ft (1.5 mil gal)	Active	1967 to present	chromium, lead, selenium,	
	Pond No. 4	170 ft x 200 ft (1.3 mil gal)	Active	1971 to present	chromium, lead, selenium, silver	
	Pond No. 5	150 ft x 150 ft (1.5 mil gal)	Active	1971 to present	chromium, lead, selenium, silver	
F	Fill areas west of wastewater treatment ponds	200 ft x 500 ft (overall)	Inactive	1966 to 1967	barium, cadmium, lead	

EXHIBIT B (Cont'd)

PROFILE OF PREVIOUS AND EXISTING SOLID WASTE MANAGEMENT UNITS RMI SODIUM PLANT ASHTABULA, OHIO

Map Code	Name	Approx. Dimensions	Status	Period of Use	Potenital Hazardous Constituents	Other Information
G	Fill area north of wastewater treatment ponds	200 ft x 300 ft	Inactive	1956 to 1976	barium, cadmium, lead	Received wastes from present site of waste- water treatment ponds; filled low areas
Н	Sulfuric Acid ^b Neutralization System	50 ft x 25 ft	Active	1971 to present	None known	

^aThe two active hazardous waste management units for which RMI holds a RCRA operating permit, the South Chute Waste Pile and the Burning Room, are not included in this listing.

bPart of RMI's NPDES treatment system (DEPA Permit No 3IE00012*AD). The permit specifies discharge limitations for the following parameters: TDS, TSS, TRC, and BOD5.

EXHIBIT C

WASTEWATER TREATMENT SLUDGE CHARACTERISTICS

RESERVE ENVIRONMENTAL SERVICES INC.

5841 Woodman Avenue • P.O. Fox 1038 • Ashtobulo, Ohio 44004

Phone (216) 997-5337

Dear Customer:

Eased upon the RCRA regulations adopted May 19, 1980, RES must retain on file a detailed description of all waste material accepted for disposal. Also, the completion of this form will enable proper handling, storage and treatment of your waste materials. All information will be held in strict confidence.

All answers should be typewritten or printed in ink. Do not use pencil. Be thorough in completing the form by using Not Applicable or None in the appropriate blanks. Your cooperation in this matter is deeply appreciated.

Donald Koski, Vice-President

Please return form to: Reserve Environmental Services .

If other, please describe

5841 Woodman Avenue

Ashtabula, OH 44004

Phone: 216-997-5337 or 992-2162

Generating Facility (Location):	State Road at East 6th S	Street
	Ashtabula, Ohio 44004	
Company Contact/Official (List To	ωo)	
Name	<u>Title</u>	Phone
George W. Hakkio	Chief Engineer	216 - 997-5141
Lawrence S. Hanek	Plant Manager	216997-5141
PART II : #1 LAGOON A. General Properties of the Was		Mixture organic/inorganic
Organic	Inorganic	% Organic % Inorganic

	рН		Hot Acidity (as CaCO ₃)
	Solids		
	Total %_		Total Dissolved
	Specific G	revity:	or pounds/unit volume
Principal Co	nstituents	s (express es %)	
Sulfur	ic Acid (H	2504)	Sodium Hydroxide (NaOH)
	chloric Ac	~ ~	Ammonium Hydroxide (NH ₄ OH)
Hydro	fluoric Ac	id (HF)	Calcium Hydroxide (Ca(OH)2)
Nitric	(HNO ₃)		Calcium Oxide (CaO)
Phosph	noric (H3P	04)	Sodium Carbonate (Na ₂ CO ₃)
Heavy Metal	ls (mg/l or	% concentration	on)
Al _		Cu	Ni Others
As _		Fe	Se
Ba _		. Pb	Ag
Cd		. Mn	Sn
Cr _		Hg	Zn
Others .			
NH ₃ -		CN	
ART IV - If	the waste	e material is a s	olid; complete the following:
Description H ₂ SO ₄ neutr		generating pro	ocess or source (i.e., precipitated sludge fro
Prec	ipitated s	sludge from chl	orine neutralization.

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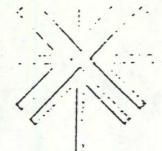
The solid waste is:
% Solids 60 % Moisture 40 Dry
Is the waste a "hazardous waste" as defined by the Resource Conservation and Recovery Act dated May 19, 1980
Yes NoX Pending Promulgation
If yes or pending promulgation, attach the most recent EPA leachate extraction analyses.
PART V
Quantity for disposal volume(s) 3000 T/YEAR *
*Express as; cubic yards/day, tons/week, gallons/day, etc.
Transporting/Hauling by: Generator Disposer X
Type of equipment required: Drag line bucket to load dump trucks suitable
for sludge waste transportation.
Please attach any other additional information that would be pertinent to the proper and lawfull handling, transporting, treating or disposal of your waste material.
Person Completing this Form L. S. Hanek Please Print
Company or Official Signature SHareh
Title Plant Manager
Date August 4, 1981

#1 Lagoon

#1 Lagoon - Typical Analysis

Water	38.8%
HC1 Insoluble	1.7%
Ferric Oxide	.6%
Calcium Carbonate	32.1%
Calcium Sulfate	2.1%
Sodium Chloride	3.2%
Calcium Chloride	21.2%
Available Chlorine	.39%

EP Toxicity	Mg/1
As	<0.4
Ba	.3
Cd	< .01
Cr	.10
РЬ	< .05
Нд	.021
Se	< .4
Ag	.1



RESERVE ENVIRONMENTAL SERVICES INC.

Ashlobula, Ohio 44004 5841 Woodman Avenue P.O. Box 1038

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Dear Customer:

Eased upon the RCRA regulations adopted May 19, 1980, RES must retain on file a detailed description of all waste material accepted for disposal. Also, the completion of this form will enable proper handling, storage and treatment of your waste materials. All information will be held in strict confidence.

All answers should be typewritten or printed in ink. Do not use pencil. Be thorough in completing the form by using Not Applicable or None in the appropriate blanks. Your cooperation in this matter is deeply appreciated.

Moneta. Francia (195) Sunald Koski, Vice-President

Plcase return form to: Reserve Environmental Services .

If other, please describe

5841 Woodman Avenue

Generator Name: RMI Company	/ - Sodium Plant	
Generating Facility (Location):_	State Road at East 6	th Street
	Ashtabula, Ohio 4400	4
Company Contact/Official (List Tw	20)	
Name	<u>Title</u>	Phone
George W. Hakkio	Chief Engineer	216 - 997-5141
Lawrence S. Hanek	Plant Manager	216 - 997-5141
PART II : #2 LAGOON A. General Properties of the Was	te Material:	
Organic	(Inorganic)	Mixture organic/inorganic % Organic % Inorganic
B. Physical Properties at Ambien	t Temperature:	
Solid (Sludge)	Liquid D	ust/Powder

PAR	T III - II the west	e maicrial is a	a liquid, complete the following: N/A
	рН		Hot Acidity (as CaCO ₃)
	Solids		
	Total %		Total Dissolved
	Specific Gr	evity:	or pounds/unit volume
Princ	ipel Constituents	(express as %)	
	Sulfuric Acid (Hg	so ₄)	Sodium Hydroxide (NaOH)
	Hydrochloric Aci		Ammonium Hydroxide (NH ₄ OH)
	Hydrofluoric Aci	d (HF)	Calcium Hydroxide (Ca(OH),)
	Nitric (HNO3)		Calcium Oxide (CaO)
	Phosphoric (H3PC)4) _	Sodium Carbonate (Na ₂ CO ₃)
Heav	y Metals (mg/l or	% concentrati	on)
	A1	Cu	NiOthers
	As	Fe	Se .
	Ba	Pb	Ag
	Cd	Mn	Sn
	Cr	Hg	Zn
Other	S .		
	NH ₃	CN	
PART	· IV - If the waste	material is a	solid; complete the following:
Descr H ₂ SO	iption of waste neutralization)	generating pr	ocess or source (i.e., precipitated sludge fr
	Precipitated slu	idge from sulf	furic acid neutralization, sludge from brine
	treatment, and v	various other	in-plant streams.
Descr	iption of the phy	sical propert	ies of waste material (i.e., dry powder, lig

The sono waste is:
% Solids 40 % Moisture 60 Dry
Is the waste a "hazardous waste" as defined by the Resource Conservation Recovery Act dated May 19, 1980
Yes No X Pending Promulgation
If yes or pending promulgation, attach the most recent EPA leachate extract analyses.
PART V
Quantity for disposal volume(s) 2000 T/Year *
*Express es; cubic yards/day, tons/week, gallons/day, etc.
Transporting/Hauling by: Generator Disposer X
Type of equipment required: Drag line bucket to load dump trucks suitable
for sludge waste transportation.
Please attach any other additional information that would be pertinent to the propend lawfull handling, transporting, treating or disposal of your waste material.
Person Completing this Form L. S. Hanek Please Print
Company or Official Signature Stanch
Title Plant Manager

RMI Company - Sodium Plant - Attachment No. 1

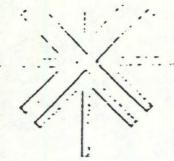
#2 Lagoon

#2 Lagoon - Typical Analysis

Water	61.7%
HCl Insoluble	23.9%
Ferric Oxide	.5%
Calcium Carbonate	2.6%
Calcium Sulfate	5.3%
Sodium Chloride	6.1%
Calcium Chloride	-
Available Chlorine	-

EP Toxicity	M	9/1
As	<	.4
Ba .		.3
Cd	<	.01
Cr		.076
Pb		.05
Hg		.0005
Se	<	.4
Ag	<	.05

RESERVE ENVIRONMENTAL SERVICES INC.



5841 Woodman Avenue . P.O. Box 1038 . Ashlobula, Ohio 44004

Phone (216) 997-5337

Dear Customer:

Eased upon the RCRA regulations adopted May 19, 1980, RES must retain on file a detailed description of all waste material accepted for disposal. Also, the completion of this form will enable proper handling, storage and treatment of your waste materials. All information will be held in strict confidence.

All answers should be typewritten or printed in ink. Do not use pencil. Be thorough in completing the form by using Not Applicable or None in the appropriate blanks. Your cooperation in this matter is deeply appreciated.

Dunald Koski, Vice-President

Please return form to: Reserve Environmental Services .

5841 Woodman Avenue

Ashtabula, OH 44004 Phone: 216-997-5337 or 992-2162

PART I Generator Name: RMI Company	- Sodium Plant	
Generating Facility (Location):		h Street
	Ashtabula, Ohio 44004	
Company Contact/Official (List Tw	0)	
Name	<u>Title</u>	Phone
George W. Hakkio	Chief Engineer	216 - 997-5141
Lawrence S. Hanek	Plant Manager	216 - 997-5141
PART II : TREATMENT TANKS A. General Properties of the Was	te Material:	
Organic .	(Inorganic)	Mixture organic/inorganic Z Organic Z Inorganic
B. Physical Properties at Ambien	t Temperature:	
Solid Sludge	Liquid Du	st/Powder
If other please descri	he	

рН		Hot Acidity (as CaCO3)	
Solids			
Total	%	Total Dissolved	
Specif	ic Gravity:	or pounds/unit volume	
Principel Constitu	uents (express as %)		
Sulfuric Aci	d (H2SO4)	Sodium Hydroxide (NaOH)	
	e Acid (HCl)	Ammonium Hydroxide (NH ₄ OH)	
Hydrofluoria	Acid (HF)	Calcium Hydroxide (Ca(OH)2)	
Nitric (HNO	2)	Calcium Oxide (CaO)	
Phosphorie (0	Sodium Carbonate (Na ₂ CO ₃)	
	Λ or % concentratio	n)	
Al	Cu	Ni Others	
As	Fe	Se	
Ba	Pb	Ag	
Cd	Mn	Sn	-
Cr	Hg	Zn	
Others			
ΝН3	_ CN		
ART IV - If the v	vaste material is a so	olid; complete the following:	
Description of war		cess or source (i.e., precipitated sludge	fr
Precipi	tated sludge from br	rine treatment.	

The solid waste is:				
% Solids88	% Moisture _	12	_ Dry	
Is the waste a "hazardous wasted May 19, 19		ned by th	e Resource Con	servation an
Yes No	X	Pen	ding Promulgation	de Bereij
If yes or pending promulgation analyses.	on, attach the	most re	cent EPA lcacha	te extraction
PART V				
Quantity for disposal volume(s)	14 T/Week		*	
*Express as; cubic yards/day, to	ons/week, gallo	ns/oay, et	c.	
Transporting/Hauling by: Ge	nerator		Disposer _	х .
Type of equipment required:	. Vacuum equ	pment or	sludge pumps to	vehicles
	suitable to	haul was	te sludge.	
Please attach any other additionand lawfull handling, transporting				
Person Completing this Form		L.	S. Hanek	
Company or Official Signature		PI	SHaneh	
Company or Official Signature)/Yu.	
Title			ant Manager .	
Date		Au	gust 4, 1931	

RMI COMPANY - Sodium Plant - Attachment No. 1

Treatment Tanks

Treatment Tanks - Typical Analysis

Barium Sulfate	25.0%
Calcium Sulfate	24.5%
Sodium Chloride	28.7%
Iron	.5%
Water	11.3%

EP Toxicity	Mg/1
As	< .04
Ba	1.5
Cd	< .01
Cr	< .01
Pb	< .05
Hg	.0006
Se	< .04
Ag	.08

EXHIBIT D

GEOPHYSICAL SURVEY REPORT

SURFACE GEOPHYSICAL SURVEY RMI SODIUM PLANT ASHTABULA, OHIO

Prepared for:

RMI COMPANY Niles, Ohio

Prepared by:

AWARE Incorporated 227 French Landing Drive Nashville, Tennessee 37228

(615) 255-2288

July 1988



consultants in environmental management

July 5, 1988

6120

Mr. Joe T. Holman Director, Environmental Affairs RMI Company P.O. Box 269 1000 Warren Avenue Niles, OH 44446

RE: RMI Sodium Plant Surface Geophysical Survey Report

Dear Joe:

We are pleased to submit the RMI Sodium Plant Surface Geophysical Survey report. This report, and associated field investigation, were prepared in accordance with Task 2 of the Work Plan for the RCRA Facility Investigation, RMI Sodium Plant, Ashtabula, Ohio, dated June 1987.

We welcome your questions and comments on the enclosed information.

Sincerely,

AWARE Incorporated

Robert J. Guidry

Hydrogeologist

Jeffrey L. Pintenich, P.E.

Vice President

Enclosures

cc: Scott D. MacMillin

TABLE OF CONTENTS

<u>Title</u>	Page No
LETTER OF TRANSMITTAL	
Table of Contents List of Figures	i ii
INTRODUCTION	1
PRINCIPLES OF EQUIPMENT OPERATION	4
EM 34-3 Terrain Conductivity Meter Bison Model 2350B Earth Resistivity System	4 5
GEOPHYSICAL SURVEY GRID	6
Procedure Results	6 6
GEOPHYSICAL SURVEY TRAVERSES	8
Procedure Results	8 9
RESISTIVITY SOUNDINGS	11
Procedure Results	11 12
CONCLUSIONS	12

LIST OF FIGURES

Figure No.	<u>Title</u>	Page No
1	Isoconductivity Map EM 34-3 Vertical Coil Orientation	2
2	Isoconductivity Map EM 34-3 Horizontal Coil Orientation	3
3	Conductivity Traverses Cross Section A-A' and B-B'	10

SURFACE GEOPHYSICAL SURVEY RMI SODIUM PLANT ASHTABULA, OHIO

INTRODUCTION

A surface geophysical survey was conducted over four primary areas of known or suspected waste disposal activities at the site (see Figure 1, Areas 1 through 4). The purpose of this survey was to further define the areas of past waste disposal and possibly their effects on groundwater and soil conditions.

The survey utilized both terrain conductivity and earth resistivity methods. Most of the data were collected by the terrain conductivity method using a Geonics Model EM 34-3 terrain conductivity meter. The resistivity survey was conducted with a Bison Model 2350B Earth Resistivity System. Two methods of terrain conductivity were utilized. The first method involved taking terrain conductivity measurements on a 50 ft rectangular grid covering a 900,000 sq ft area (see Figures 1 and 2). These measurements were taken using a 10 meter coil separation in both the horizontal and vertical coplanar coil orientation.

A second method of terrain conductivity survey was conducted utilizing a series of linear traverses over and adjacent to the four waste disposal areas. These measurements were taken using a 20 meter coil separation in both the horizontal and vertical coplanar coil orientation.

The earth resistivity method was utilized to conduct vertical soundings at two different locations on the site (see Figure 1). These soundings provided information used to determine whether or not ground penetrating radar (another geophysical technique) would have been an effective tool to aid in the site investigation.

A series of aerial photographs, taken over the period from 1949 to 1959, were examined in an attempt to identify additional areas of past waste disposal at the

site. Previously identified waste disposal areas, disposal areas indicated from the aerial photographs, and active waste management areas noted during the geophysical survey are combined and included in Figures 1 and 2 of this report.

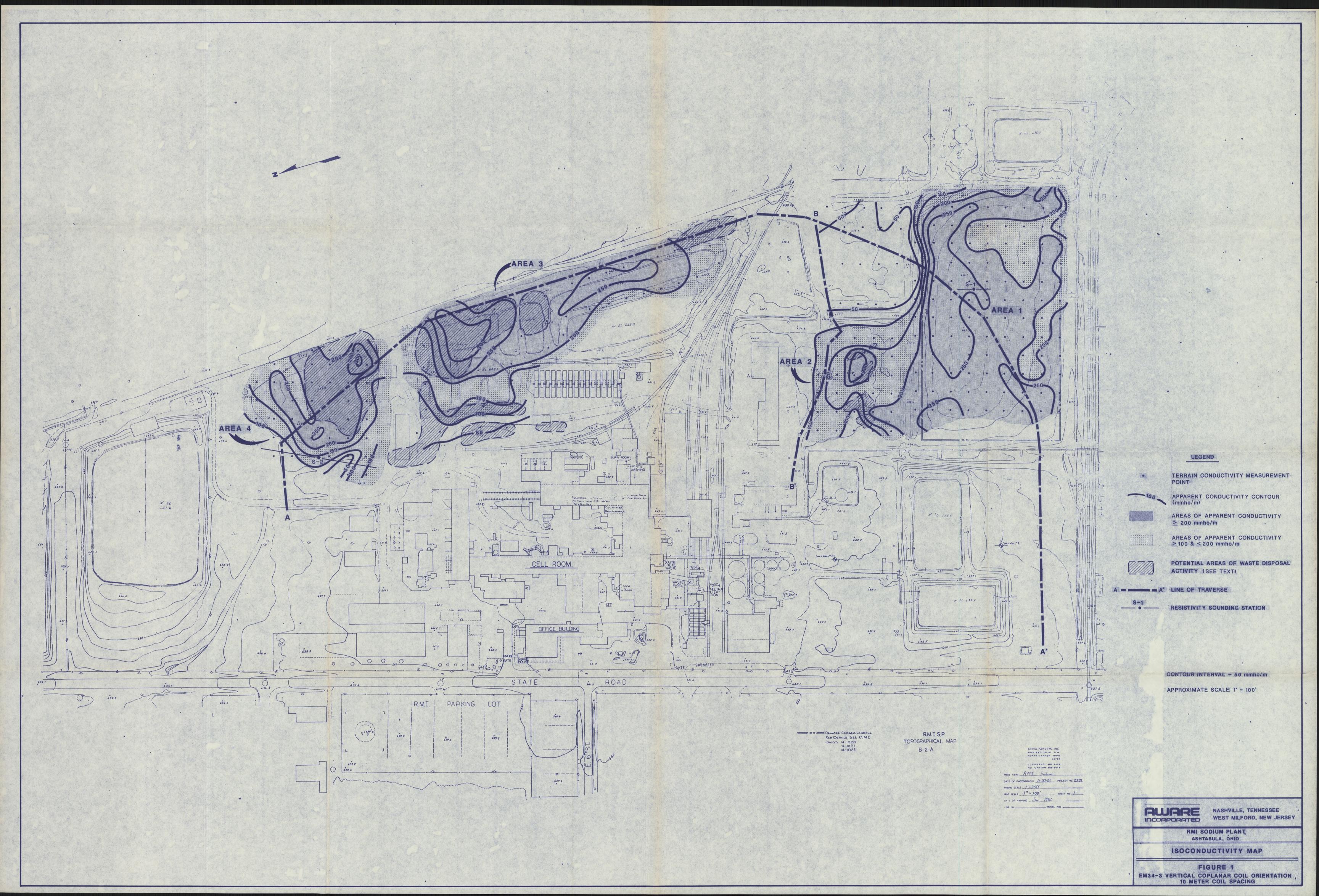
PRINCIPLES OF EQUIPMENT OPERATION

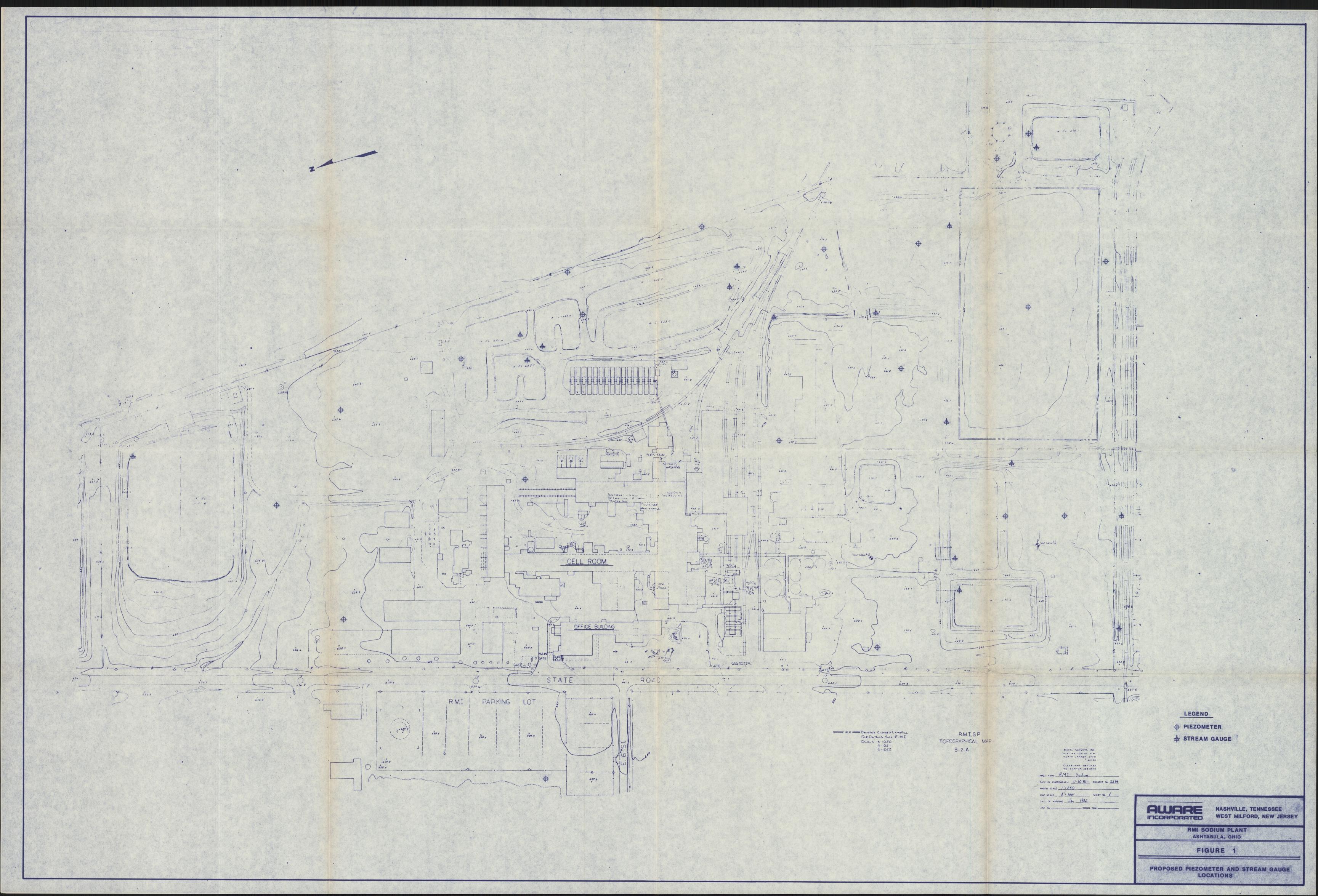
The following information is provided as a generalized background on the theory of operation of those tools used during the geophysical survey of the site.

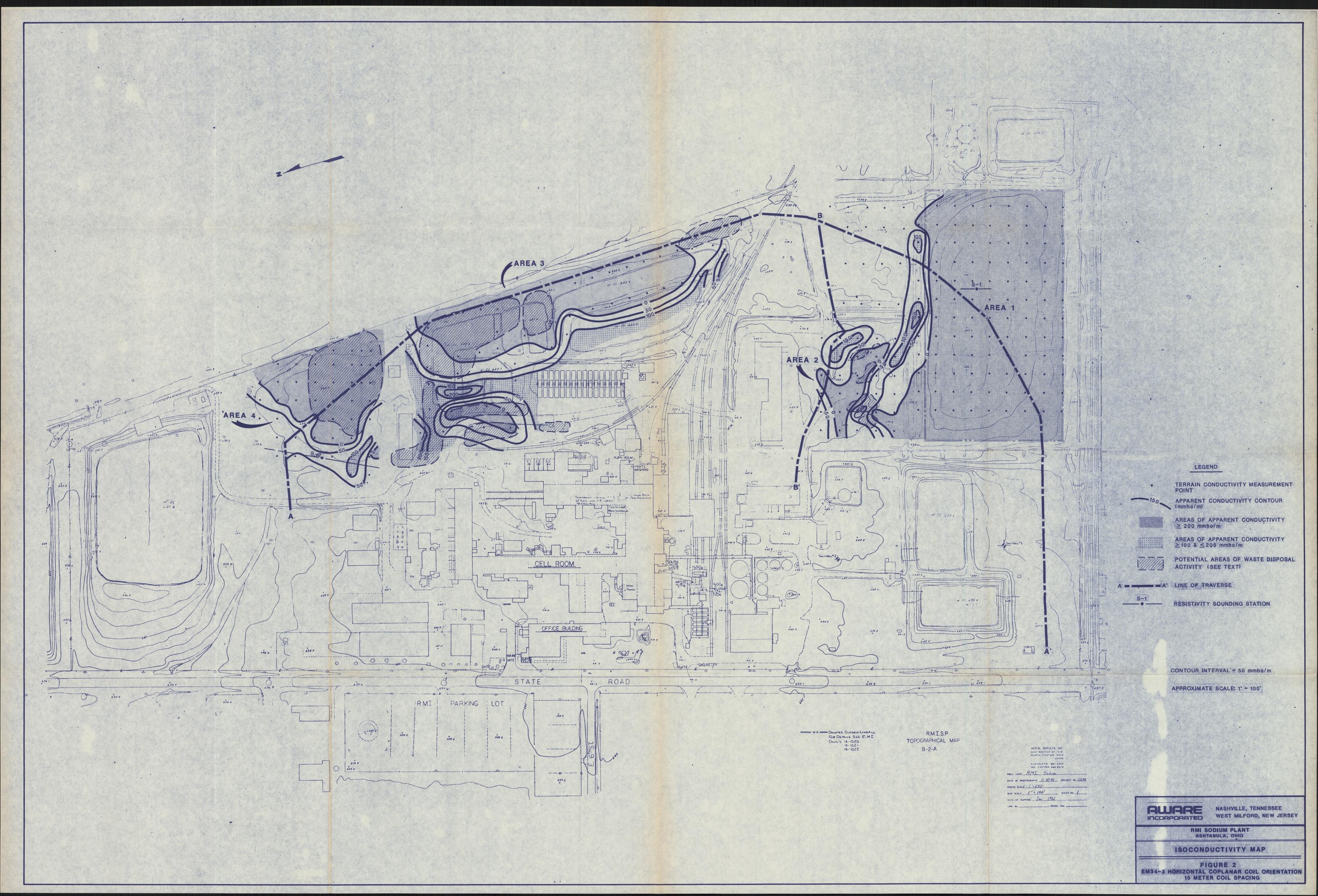
EM 34-3 Terrain Conductivity Meter

The terrain conductivity meter utilizes two coils, a transmitter coil and a receiver coil, that are placed on the ground. An alternating voltage is applied to the terminals of the coil causing a current to flow. The current generates an alternating magnetic field which causes electrical currents to be induced in the ground. The induced current in the earth generates a secondary magnetic field. Both the primary and the secondary magnetic fields are detected by the receiver coil located at a specified distance from the transmitter coil. In general, the ratio of the secondary to the primary magnetic field strengths is used to determine the apparent electrical resistivity, and in turn the apparent conductivity of the earth.

The maximum contribution to a conductivity measurement comes from the surface and near surface material, when a measurement is taken with the coils in the vertical coplanar coil orientation (coils are placed upright on the ground and kept in the same plane). When a measurement is taken with the coils in the horizontal coplanar orientation (coils are laid down in a horizontal position and kept in the same plane), the maximum contribution to the conductivity measurement comes from a depth below the instrument, equal to approximately 0.4 times the coil spacing. This means that by obtaining measurements at one point in both the horizontal and vertical coplanar orientation, one can gain important information on significant changes in conductivity with depth. This also means that by varying the spacing between the transmitter and receiver coils, one can gain even more information for making inferences about the subsurface conditions which exist at a given site.







One important deficiency in this system is the equipment's inability to generate accurate conductivity readings when ground conductivities exist at very high values. At measured conductivity values greater than 300 mmho/m, the linear relationship between indicated (apparent) conductivity and true conductivity rapidly breaks down. When true ground conductivity reaches values greater than 700 mmho/m (horizontal coplanar coil orientation), the equipment will indicate a less than zero value for conductivity. This phenomenon is a result of what is technically defined as "operation at low values of induction number" (see Geonics TN-6 for an in-depth explanation of this theory). When reviewing the survey data, it is important to know that areas showing zero or less than zero apparent conductivity values are actually areas of very high apparent conductivity.

Electrical conductivity is a function of soil or rock type, porosity and permeability of the rock, and the pore fluids present in the rock. The conductivity of the pore fluids usually provides the greatest contribution to a conductivity measurement. The presence of conductive contaminants in the pore fluids will cause a corresponding increase in the conductivity measurement. The presence of buried conductive wastes will also cause an increase in conductivity measurements. Therefore, the lateral and vertical changes in conductivity, with respect to background values, are potential indicators of the presence of buried conductive wastes and/or their associated contaminants.

Bison Model 2350B Earth Resistivity System

Four metal electrodes are inserted into the ground in a straight line and equally spaced (Wenner electrode configuration). A voltage is applied across the two outer electrodes causing a current to flow in the soil. The resultant voltage measured across the two inner electrodes provides a measure of the apparent soil resistivity. The depth to which resistivity is sensed is determined by the inter-electrode spacing. By increasing the electrode spacing, one increases the depth of investigation.

GEOPHYSICAL SURVEY GRID

Procedure

The survey team used a site topographic map and a tape measure to establish and maintain a grid of 50 ft centers. The grid survey encompassed three primary areas of past and present waste disposal activities: Area 1 - the closed landfill on the southern end of the site. Area 2 - an area of past and present waste disposal activity, and Area 4 - an area of past disposal activity (see Figures 1 and 2). The four active wastewater treatment ponds present in Area 3 made it impossible to maintain a grid of 50 ft centers over this area. Survey coverage of this area was accomplished by taking traverse measurements on a 50 ft spacing around and between the ponds using a site topographic map for orientation.

All measurements taken during the grid survey of Areas 1 through 4 were taken using a 10 meter coil separation. First, a conductivity measurement was taken with the coils in the vertical coplanar orientation. After the measurement was recorded, another measurement was taken in the horizontal coplanar coil orientation. The survey team would then move on the next measurement point and repeat the procedure.

Results

Figure 1 is an isoconductivity map generated from measurements taken with the EM 34-3 in the vertical coplanar coil orientation. With this coil orientation, the maximum contribution to conductivity readings comes from the surface and near surface material.

An area of low apparent conductivity has been detected immediately north of Area 1 and west of Area 2 (Figure 1). Detected conductivities in this area range from 30 to 69 mmho/m. For the purpose of this survey, this area has been considered to be typical of undisturbed, uncontaminated geologic conditions and will serve as a background for comparisons with Areas 1 through 4.

Area 1, on the southern end of the site, has apparent conductivity values ranging from 125 to 295 mmho/m—well above established background values. A previously constructed clay cap over Area 1 may have partially elevated these values. However, these high values are mostly believed to be due to the presence of buried waste beneath the cap. Areas of very high apparent conductivities (greater than 250 mmho/m) probably either represent higher concentrations of buried waste beneath the cap, or a thinning of the clay cap causing buried waste to lie closer to the surface, thus being more readily detected.

Area 2 (Figure 1), lying immediately north of Area 1, is an area of past waste disposal activity which is now used for surplus equipment and demolition scrap storage. Conductivity readings in this area range from 66 to 270 mmho/m. Most of the area has apparent conductivity values well above background values. The highest readings in the center of the area are partially due to the presence of metallic equipment and scrap cell bodies present on the surface.

Area 3 (Figure 1), lying north of Area 1 along the eastern border of the site, served as a waste disposal site in the past. Presently, there are four active wastewater treatment ponds residing in the area. Apparent conductivities here range from 40 to greater than 300 mmho/m. The highest concentrations of readings are detected along the eastern side of the area and decrease to background values of 40 to 80 mmho/m toward the northwest.

Area 4 (Figure 1) is another area of past waste disposal activity. Conductivity readings here range from 35 to 300 mmho/m. Again, most of the area exhibits apparent conductivities well above background values. The highest readings are in the center of the area and decrease to background values toward the north and west.

Figure 2 is an isoconductivity map generated from measurements taken with the EM 34-3 in the horizontal coplanar coil orientation. The maximum contribution to conductivity readings in this data set comes from a depth of approximately four meters (i.e., this coil orientation senses conductivities from a deeper interval than when the vertical orientation is used).

In general, the aerial distribution of high apparent conductivity seen on Figure 2 roughly parallels that of Figure 1. With few exceptions, there is a distinct increase in apparent conductivity with depth in Areas 1 through 4.

The background area (north of Area 1 and east of Area 2) has conductivity readings ranging from 16 to 46 mmho/m, reflecting a slight decrease in apparent conductivity with depth.

Area 1 (see Figure 2) shows conductivity readings of less than 0 (extremely high) over the entire closure area.

Area 2 (see Figure 2) shows the distribution of high apparent conductivity to be not as wide spread as that in Figure 1, but more definable and higher in magnitude. Again, the presence of surplus equipment and metallic demolition scrap at the surface is expected to have had some impact on these high conductivity readings.

Area 3 (see Figure 2), as in Figure 1, shows anomalously high apparent conductivity along the eastern side of the area. The northwestern section of Area 3 shows another anomalously high area of apparent conductivity not seen on Figure 1. This anomaly could be caused by waste buried deeper below the surface than in the other areas. The anomaly may also be present as a result of a groundwater contaminant plume emanating either westward from Area 3 or southward from Area 4.

Area 4 (see Figure 2) shows the distribution of high apparent conductivity to be very similar to that seen in Figure 1. Again there is a distinct increase in apparent conductivity with depth over this area.

GEOPHYSICAL SURVEY TRAVERSES

Procedure

A series of geophysical traverses over the site were completed for the purpose of identifying potential groundwater contaminant plumes resulting from past waste

disposal activities. Forty-one hundred linear feet of traverses were accomplished using the EM 34-3 terrain conductivity meter with a 20 meter coil separation in both the horizontal and vertical coplanar coil orientations. Two readings were taken every 50 ft along the lines of traverse and plotted on a graph of distance versus conductivity (see Figure 3).

The traverse line A-A' (see Figure 1 or 2) begins northwest of Area 4 and generally trends southward crossing Area 4, Area 3, the background area, Area 1, and then heads west terminating south of the brine ponds. Traverse line B-B' (see Figure 1 or 2) begins at Line A-A' east of Area 2. The line trends westward along the northern boundary of the background area and Area 2, terminating to the west.

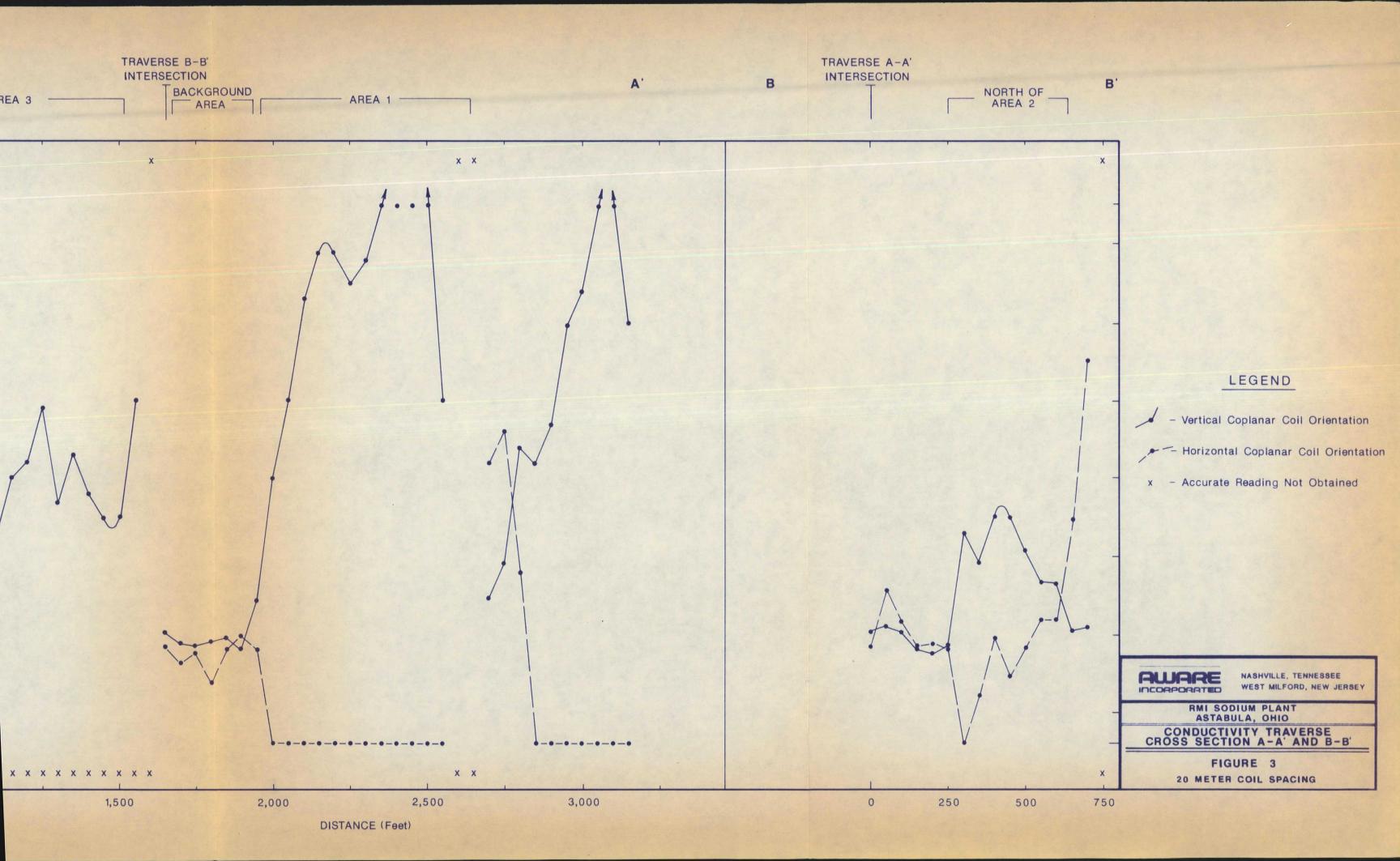
Results

Figure 3 shows the apparent conductivity values collected from traverses A-A' and B-B'. The conductivity data from both the horizontal and vertical coplanar coil orientation are plotted on the graph versus distance.

The data over Areas 1 and 4 (see Figure 3, Line A-A') clearly show, as seen earlier, that apparent conductivity increases with depth. Note on the graph that the values for apparent conductivity in both coil orientations over these areas are higher than those seen in Figures 1 and 2. This is because increasing the coil spacing from 10 to 20 meters increases the depth of investigation of the tool, again confirming that apparent conductivity increases with depth over the waste disposal areas.

Over the background area, the traverse conductivity readings decrease to the normal established levels for uncontaminated conditions (see Figure 3, Line A-A' and B-B').

Much of the traverse conductivity data collected over Area 3 (see Figure 3, Line A-A') is unreliable. This is attributed to cultural influences such as buried pipes in the area, the close proximity to the fence, the buried french



drain system around the ponds, etc. which interfere with equipment function. The increased coil spacing of 20 meters used for the traverses makes the equipment more susceptible to interference than with the 10 meter coil spacing used during the grid survey.

The end of traverse line A-A' (see Figure 3) shows high conductivity readings over the area south of the brine ponds. The presence of buried pipes in this vicinity may contribute to these high readings. A saline groundwater plume migrating southward from the brine ponds could also cause this response. If sand or gravel bedding are associated with the buried pipes, it could create an avenue of transport for plume migration.

RESISTIVITY SOUNDINGS

Two resistivity soundings were conducted at the site. This was done, primarily, to evaluate the potential effectiveness of ground penetrating radar (GPR) at the site. If soils of high conductivity (greater than 40 mmho/m) are present at or near the ground surface, the GPR signal is attenuated. This greatly reduces radar's effectiveness as a useful investigative tool. Unlike the terrain conductivity meter, the resistivity sounding method allows a shallow interval of earth to be measured for its electrical properties with no contribution from the deeper interval.

Procedure

The resistivity soundings were taken with a Bison 2350B Earth Resistivity System using the Wenner "A" spacing electrode configuration. A set of resistivity data is obtained by beginning with a small electrode spacing, taking a reading, and then increasing the electrode spacing logarithmically with each reading. These readings are then plotted on a graph of apparent resistivity versus electrode spacing and compared with a set of standardized master curves to generate a model for layered earth resistivity.

Results

Resistivity sounding No. 1 was taken near the center of Area 1 (see Figure 1 or 2). The sounding shows the upper 3 to 4 ft of material at this location to have an average apparent resistivity of approximately 8 ohm-m. The equivalent apparent conductivity for this interval is 125 mmho/m.

Resistivity sounding No. 2 was taken near the western boundary of Area 4 (see Figure 1 or 2). Measurements here show the upper 5.5 ft of material to have an average apparent resistivity of 11.5 ohm-m. The equivalent apparent conductivity for this interval is 87 mmho/m.

The wide-spread distribution of high apparent conductivity over the site, as indicated by the EM34-3 survey (see Figures 1 and 2), coupled with the high conductivity values obtained from the two resistivity soundings suggest that GPR traverses would be of little value to the site investigation. With this in mind, it was decided not to include GPR as part of the geophysical survey of the site.

CONCLUSIONS

The site surface geophysical survey results show that areas of high apparent conductivity are directly associated with the four previously identified areas of waste disposal activity. Those areas were the lateral extent of high apparent conductivity exceeds that of the previously identified boundaries of waste disposal may be interpreted in two ways:

- the areas of past waste disposal are larger than previously indicated,
 or
- lateral migration from the buried waste of conductive contaminants in the groundwater has occurred.

Possibly, a combination of both of these conditions exists.

Comparisons were made between conductivity measurements taken with the EM 34-3 coils in the horizontal and vertical coil orientations using a 10 meter coil

separation (grid survey) and a 20 meter coil separation (traverse survey). These comparisons show that, in Areas 1 through 4, there is a distinct increase in apparent conductivity with depth. Survey coverage over background areas shows that apparent conductivity decreases with depth. These conditions suggest that subsurface emplacement of conductive wastes and/or downward migration of conductive contaminants has occurred below the four areas.

The geophysical traverses revealed one area of anomalously high apparent conductivity not readily associated with the four waste disposal areas. This anomaly occurs on traverse line A-A' in the area south of the Brine Ponds and west of the closed landfill. The presence of this anomaly is believed to be related to the Brine Ponds and their associated buried pipes.

The results of this geophysical survey are intended to characterize the spatial distribution of potential contaminants at the site. The survey results should not be used as a definitive depiction of site conditions, but should be employed as a guide for other, more direct methods of investigation.

Joe T. Holman RMI Company-Sodium Plant Post Office Box 269 1000 Warren Avenue Niles, Ohio 44446

RE: Requested Document
RMI Company-Sodium Plant
Ashtabula County, Ohio
OHD 000810242

Dear Mr. Holman:

Enclosed you will find a U.S. EPA guidance document that you requested, titled "Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Compounds."

This is the guidance document that was referred to on page 8-22 of the RCRA Facility Investigation guidance. As noted in the document's title, the criteria listed are only interim values.

Sincerely,

Francine P. Norling Environmental Scientist

Enclosure

5HS/Norling: vw

4/27/88

Disk #10

	RCRA	TYP.	ALCTU	II	IN		国际主张				
	PERMITS INIT. DATE	1, Wa	AUTH.	CHIEF	IN. CHIEF	MI. CHIEF	MN/WI CHIEF	OH. CHIEF	RPB CHIEF	O. R. A.D.D.	WMD DIR
L	DATE	4,29	4/28/08								May 178